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KING'S COLLEGE, London, has received an anonymous gift of £25,000 towards the liquidation of its debt.

MR. JOHN P. ASHLEY, PH.D., has been elected President of Albion College, at Albion, Mich., succeeding Dr. Lewis R. Fiske, who has resigned, owing to advanced age, after twenty years of service.

DR. E. G. LANCASTER has been appointed professor of psychology and pedagogy at Colorado College.

A CHAIR of 'tropical diseases,' with Dr. J. E. Stubbert as the first incumbent, has been established in the New York University Medical College.

A COMMITTEE has been formed in London to present a plan for a London University, to be called University of Westminster, in case the bill before Parliament meets with continued opposition. The present degree-conferring University of London would according to the plan remain unchanged, while the different institutions of London would form themselves into a faculty of law, a faculty of medicine, etc., each institution to be financially independent and only to agree on the nature and duration of the studies required for degrees and distinctions.

*DISCUSSION AND CORRESPONDENCE.  
IN REGARD TO THE MARINE BIOLOGICAL LABORATORY AT WOODS HOLL, MASS.*

TO THE EDITOR OF SCIENCE.—A full and adequate rejoinder to the statement which appeared in SCIENCE October 8, 1897, has been prepared and is now ready. In our opinion, however, controversial matters relating to the management of a scientific institution, especially when consisting of details, statistics or mooted points, are out of place in public prints. The subject is not of general interest, and discussion of this kind tends to injure any institution in the public estimation.

The undersigned, therefore, prefer to reply only to those concerned in the matter. To this end we shall issue to all members of the corporation and others concerned a detailed reply to the charges brought by the former Trustees. Others who may feel interested can obtain

copies by applying to the Secretary of the Trustees of the Marine Biological Laboratory, Woods Holl, Mass., or to either of the undersigned.

SAMUEL F. CLARKE,  
EDW. G. GARDINER,  
J. PLAYFAIR McMURRICH.

*Anthropologische Studien ueber die Ureinwohner Brasiliens.* Von DR. PAUL EHRENREICH. Braunschweig, Vieweg und Sohn. 1897. 4to. Pp. 168. 30 Plates.

This work ranks among the most valuable which have appeared for years in American Anthropology. It is, to be sure, somewhat limited in its area of observation, being principally confined to the states of Matto Grosso, Goyaz and Amazonas in Brazil; but this is more than compensated by the abundance and accuracy of the material, and the skill with which the author has brought it into bearing on the leading general questions relating to the American race.

These are treated in the general portion of the volume, occupying forty-five pages. It embraces two chapters, one on the aims and methods of physical anthropology and its bearings on ethnology; the other specifically on the anthropologic position of the American race. Much of the former is concerned with defining such terms as race, type, people, stem, family, etc.; with the conclusion that race means blood relationship, and that the racial characteristics and variations are the only real objects of study in physical anthropology. The author is here on thin ice, and his definitions, carefully trimmed as they are, can often be punctured. Blood relationship, *Blutverwandtschaft*, really means nothing, for, in one sense, the whole human species is related by blood; and as much might be said of other terms assumed to have a generally recognized sense. This merely shows how needful it is to settle on an international terminology in anthropology.

The chapter on the American race is more satisfactory. He regards it as strictly one, in the Blumenbachian sense. As for the question, Whence it came? He regards it superfluous to inquire, as it has certainly been on the continent from remotest human antiquity, probably

under widely different geological relations, and before language had developed. He considers the following three propositions 'established beyond question': 1. Man is as old in America as in Europe. 2. The oldest American skulls present the same type as those of the modern Indians. 3. Between the languages of America and Asia there is a gulf which cannot be bridged. (P. 42.)

The special portion of the book is divided into two parts, the one supplying the measurements on the living subjects, the other those on skulls and skeletons. Numerous illustrations from photographs, detailed tables and outlines of skull-forms greatly aid the student in obtaining clear ideas of the physical characters of the tribes mentioned. They include the Caribs, Bakairi, Tupis, Botocudos, Chaco tribes, and those of the valley of the Purus River.

The general conclusion which he draws from these extensive comparisons will be surprising to many, especially those who have said so much about the 'Mongoloid' traits of the American Indians. "So far as their physical traits are concerned, these Indians of ours approach much more closely the types of the Caucasian than of the Mongolian race. The arms and generally the upper extremities, the elevation of the symphysis and the navel, are thoroughly European," (P. 130.)

The osteological material was mainly from the Bororo, Karaya and Kayapo tribes. It is figured fully and the measurements presented in detail. Some of the skulls were of low capacity and their nannocephalic character suggests the already known relations of the people of the Purus, among whom they prominently occur, to the Arawacks of the northern shores of the continent, and to the island-dwellers of the West Indian archipelago.

The general impression left after an examination of the craniological measurements, however, is one of wide diversity, a diversity not satisfactorily explained by the author's various suggestions of amalgamation and environment, but from its sporadic abundance, going back to sources of variation in skull-proportions which diminish their value as race criteria.

The work is furnished with a table of contents, an index of authors quoted, and one of

subjects; a completeness of reference which it is a pleasure to note. D. G. BRINTON.

The present volume is of great importance, not only on account of the detailed information given in the special part of the work, but also on account of a critical examination of the methods of somatology. The following lines are intended as a review of this general part of the work.

Dr. Ehrenreich is one of the few anthropologists who have an equal command of somatological, ethnological and linguistic methods. His criticism of modern somatology is directed mainly against the excessive weight given to measurements as compared to morphological description and to the loose use of the terms race and type.

He would reserve the term 'race' for the principal divisions of mankind, while he would call the varieties of these main divisions 'types.' He objects strongly to the application of the term 'race' to closely affiliated varieties which differ in regard to a few measurements, while their fundamental morphological features are much alike. He justly attributes much of the confusion prevailing in anthropological literature to a lack of clear distinction between the main groups and their subdivisions, and particularly to the tendency which has developed of recent years to consider a few anthropometrical criteria as a sufficient basis for the establishment of a new race.

In determining the 'races,' or the main divisions of mankind, Ehrenreich demands the consideration of three principal phenomena. He claims that each race is characterized by similarity of anatomical traits, geographical continuity of habitat, and similarity of the structure of the languages spoken by the people constituting the race. The first two points are well taken. They refer, of course, to conditions prevailing before the modern migrations of races. I doubt, however, if it is admissible to introduce the last point of view in the definition of the principal divisions of mankind. Ehrenreich is led to include languages in the characterization of races by three considerations. He says: (1) Every race has developed a greater or lesser number of characteristic linguistic stocks. (2) These stocks are not found outside

the limits of each race, excepting a few instances which are explained by certain peculiar conditions. (3) There are fundamental differences between the structures of the languages spoken by the different races, and no connecting links between them exist. Based on these arguments he distinguishes six races, leaving the position of the Papuas and of the black peoples of Asia doubtful. I will not lay great stress upon the fact that these principles of classification lose their applicability among the last-named people, as in their case peculiar conditions prevail. But there are other cases which show that these principles do not help us to establish a definite number of races. The linguistic considerations would make it impossible to include the pre-Aryan peoples of Europe and western Asia, in what Ehrenreich terms the Caucasian or Mediterranean race, although the anatomical characteristics of these peoples are identical with those of the Mediterranean race. On the other hand, the American race shows considerable anatomical uniformity as compared to other races, and, nevertheless, there is no unity of structure of language in Ehrenreich's sense of the word. It is no less possible to imagine a connecting link between the principles of structure of the Algonquin and Eskimo than between the Eskimo and Ural-Altaic languages. If we are willing to consider American languages as a unit, and include only these principles in the general characterization of American languages that hold good in all of them, there is nothing to prevent us from including Ural-Altaic languages in the same group. Ehrenreich agrees in these opinions with the views expressed by Brinton in his discussion of the characteristics of American Languages. (*Essays of an Americanist*, p. 350 ff.)

Dr. Ehrenreich's second criticism of modern anthropology is directed against the excessive weight given to measurements as compared to morphological descriptions. He expresses the opinion that the classification according to cephalic indices which has held sway since the days of Retzius has greatly hampered the development of somatology and has made efforts at classification futile, since these were based on measurements, particularly on indices, alone, while they must be based on morphological

descriptions. These latter, he holds, cannot be replaced by numerical values. While heartily agreeing with this view, particularly with the objection to the exaggerated value given to the length-breadth index of the head, I do not think that Dr. Ehrenreich's condemnation of anthropometry is quite justified. He defines the object of somatology as the somatic investigation, description, and if possible explanation of racial characteristics. With this, I believe, all anthropologists will agree. The only question is what methods are best adapted to these ends. A broad view of the history of anthropology shows that measurements were originally introduced in order to give precision to certain descriptive features which could not be expressed satisfactorily in words. This appears to have been the leading view of Daubenton and Camper, who were the first to introduce measurements in discussions referring to comparative anatomy. The nearer alike the types which we compare, the more difficult it is to describe in words their nice distinctions. Anthropology was the first branch of descriptive biology to deal with closely allied varieties, and for this reason the need of substituting exact numerical values for vague descriptions was soonest felt. Since zoology, more particularly the study of mammals and of birds, has begun to take into consideration the geographical races of the same species we observe the same tendency of adding measurements to verbal descriptions.

In so far as Dr. Ehrenreich's criticism is directed against the substitution of measurements for descriptions that they should supplement, it is most timely and ought to be taken to heart by investigators. The terms dolichocephalic and brachycephalic as indicating two groups of head forms determined by measurements have by some investigators been raised almost to the rank of specific characters, although, as Ehrenreich justly emphasizes, and in this he has the support of Sergi, Harrison Allen and others, the sameness of the index does not by any means signify sameness of morphological type. He disclaims the significance of these characters when not supported by general morphological agreement. In all this the author is certainly right. But he overlooks entirely the principal and fundamental value of numerical measures

as illustrating the range of variability of types which cannot be given by any verbal descriptions. The type inhabiting a certain region cannot be defined satisfactorily by a substitution of descriptive features selected by even the closest observation. It is not possible, as Ehrenreich says, to represent a type by a typical individual. The description must include all the individuals in order to illustrate the composition of the group that is being studied. In order to give an adequate description it is necessary to illustrate the frequency of different types composing the group. While the types found in two adjoining areas may be almost identical their distribution may differ. The attempts to treat the same subject by means of composite photographs or composite drawings, which form a purely theoretical point seem very promising, offer serious practical difficulties which make it difficult to use these methods. The variability of a type can, therefore, be expressed only by means of carefully selected measurements. Dr. Ehrenreich states with great clearness that none of the proposed series of measurements are satisfactory, but we must add that a way exists of discovering such measurements. This way is shown in Professor Karl Pearson's admirable investigation on correlations which was suggested by Galton's important work on heredity. By its means laws of correlation may be discovered which express morphological laws. It seems to me, therefore, that the author's condemnation of anthropometrical methods for determining geographical varieties is too sweeping.

The scepticism with which the author regards the results of anthropometry lead him also to the conclusion that sameness of type is not a sufficient proof of common descent; that the latter is only proved if supported by historical and linguistic evidence. This opinion is open to serious objections. It is certainly true that it is impossible to determine by anatomical characteristics alone to what people a single individual belongs. But it is perfectly feasible to identify a series of individuals belonging to a certain people or district, if the series is sufficiently large. Dr. Ehrenreich, it would seem, has been misled by the fact that all types are variable and cannot be represented by a single

typical individual to consider the whole task a hopeless one. Even though it is not possible to establish for a people a single anatomical type to which all individuals conform and which is characteristic of that people and no other, this does not prove that we cannot trace its genesis by means of a study of the various types constituting the people and their distribution among the people itself and its neighbors. The author acknowledges this fact to a certain extent when saying: "Whoever tries to rely in these investigations on physical characters alone will certainly be led astray. A consideration of the geographical point of view and of historical evidence will give much greater certainty to his conclusions." Here, as in the discussion of the races of man, the author strongly emphasizes the geographical point of view, and in this he agrees with F. Ratzel. He urges the necessity of considering the geographical probability of blood-relationship before generalizing from anatomical similarities. The considerations of this point of view, on which the reviewer has also repeatedly insisted, will certainly prevent anthropologists from forming rash conclusions and propounding extravagant theories.

But I do not believe that the introduction of linguistic considerations in the somatological problem will be found to be of advantage. It is true that wherever we find two tribes speaking affiliated languages there must have existed blood-relationship; but we have abundant proof showing that by infusion of foreign blood the anatomical types have changed to such an extent that the original type has been practically swamped by the intruders. Such is the case in North America among the Athapaskan tribes of the Southwest, among the widely scattered Shoshonean tribes, and in many other cases. The laws according to which anatomical types are preserved are not the same as those according to which languages are preserved, and for this reason we must not expect to find the results of classifications based on these two considerations to coincide. Dr. Ehrenreich seems to think that types are too variable to give any satisfactory basis for deductions of this character. But, notwithstanding the fact that certain anatomical features are easily

affected by the influence of environment, I cannot acknowledge that any proof of the transformation of the fundamental features of types exists.

In our investigations on the early history of mankind three methods are available, each directed to a certain series of phenomena—physical type, language, customs. These are not transmitted and do not develop in the same manner. The one persists when the other changes, but all may be made to contribute to the solution of the general problem. The study of the distribution of languages permits us to make nicer divisions and to follow historical changes in greater detail than that of the distribution of physical types. But often the latter give evidence in regard to phenomena which cannot be approached by linguistic methods. The distribution of the Alpine type of man in Europe, or that of the Sonoran type in North America, may be mentioned as instances of this kind. It would be absurd to state that in these cases similarity of type does not prove blood-relationship, because there is no linguistic evidence to support it. On the contrary, the physical investigation supplies evidence that cannot be gained by linguistic facts. The three methods mentioned above are all equally valuable, but since they do not refer to the same classes of facts it must not be expected that they will clear up the same incidents in the early history of mankind, but all may be utilized with equal advantage in the study of this subject.

In regard to the affinities of the American race to other races Dr. Ehrenreich seems to be inclined to consider it as equally closely related to the Asiatic and to the European races. He lays particular stress upon the proportions of the body and the form of the hair as distinguishing the Americans from the Asiatics. In this opinion he agrees to a certain extent with Brinton. It would seem to me that in determining the position of a race we should be guided by the morphology of its most generalized forms, namely of women and children. The far-reaching similarity between American and Asiatic children and women is very striking. They have in common the wide and rather low nose, the form of the eye and of the maxilla. The

physiognomic similarity is so great that it would seem to be of greater weight than the variable proportions of the body which are much more subject to influences of environment.

FRANZ BOAS.

*The Alternating-Current Circuit: An Introductory and Non-mathematical Book for Beginners and Students.* By W. PERREN MAYCOCK. London, Whittaker & Co. 1897. 16mo. Pp. 97. Price, \$1.00.

It is the author's purpose to convey some idea of single-phase alternating currents to the minds of those new to the subject, by means of plainly worded and non-mathematical language. In his preface (April, 1897) he states that the book forms the substance of a chapter in the forthcoming Volume II. of 'Electrical Lighting and Power Distribution.' With a thorough revision it would make an admirable chapter for such a book. Although the book is small, the reviewer appreciates the amount of labor that has been spent upon it in arranging the more important alternating current phenomena and discussing them in a manner suitable for non-mathematical beginners. The author has attempted to make his style simple and clear, successfully in the main, but with many startling lapses. What idea is conveyed to a reader (and he need not be a non-mathematical beginner) from the statement (p. 8), "The current in a given circuit is thus proportional to the distance traversed at each alternation by any given coulomb,  $C$ , multiplied by the number of alternations per second ; so that if the current is kept constant, when the frequency is doubled, the path traversed by any given coulomb will be halved, and vice versa."

We note error as well as confusion ; for example, on page 64 we are told that reactance varies directly as the inductance and the mutual induction. As a matter of fact, mutual induction in a case of a transformer diminishes the reactance ; for the primary circuit of a transformer has less reactance when the secondary is loaded than when it is on open circuit. Again, it is stated (pages 64 and 85) that reactance depends directly upon the inductance and the *frequency*, and inversely upon the capacity. This is true when the current lags behind the